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10/750,445	12/31/2003	Craig Barrack	71795/00011	1976

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EXAMINER	
DONABED, NINOS J	

ART UNIT	PAPER NUMBER
2109	

MAIL DATE	DELIVERY MODE
08/08/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

MN

Office Action Summary	Application No.	Applicant(s)	
	10/750,445	BARRACK ET AL.	
	Examiner	Art Unit	
	Ninos Donabed	2109	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-54 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-54 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 December 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>12/31/2003</u> . | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Objections

1. Claim 1 is objected to because of the following informalities: **"that"** is repeated on line 14 of the claim. Appropriate correction is required.

Double Patenting

2. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

3. Claims 1, 3-8, 12-13, 16-22, 24-33, 35-41, 46, 49-51 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-21 of U.S. Patent No. 6,697,873, hereinafter referred to as Yik. Although the conflicting claims are not identical, they are not patentably distinct from each other. **(See the comparison below)**

Regarding Claim 1, Yik teaches a method of searching for a computer address in an address table, the computer address having a bit size n , the steps comprising:

(Claim 1 of Yik Col. 11 Lines 28 to 30)

partitioning the bit size n computer address into an upper set of $n-m$ bits and a lower set of m bits, wherein m comprises a bit size less than bit size n ;

generating a search index by compressing the upper set of $n-m$ bits to obtain a compressed value of the computer address, wherein the search index comprises a number of bits equal to the number of bits of the lower set of m bits; **(Claim 1 Step a of Yik Col. 11 Lines 31 to 34)**

accessing a primary address record corresponding to the computer address in a primary address table, the primary address record being accessed by using the search index to locate the primary address record, wherein the primary address record includes the computer address, a port number associated with the computer address, and a link that that specifies the location of an initial secondary address record in a secondary address table; **(Claim 1 Step b of Yik Col. 11 Lines 35 to 43)**

comparing the search index to the primary address record by: **(Claim 1 Step c of Yik Col. 11 Lines 44 to 45)**

selecting the m low order bits of the combination of the search index and the lower set of m bits, wherein a first value is determined,

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decompressing the compressed value of the address contained in the primary address record to obtain a second value, and **(Claim 1 Step c ,ii of Yik Col. 11 Lines 48 to 50)**

comparing the first value to the second value; **(Claim 1 Step c, iii of Yik Col 11. Lines 51)**

and if the first value does not equal the second value, then accessing the initial secondary address record using the link, wherein the initial secondary address record includes a respective address entry of the bit size $n-m$, a port number associated with the computer address, and a link to a subsequent secondary address record of the same hash family. **(Claim 1 Step d of Yik Col 11. Lines 52-58)**

Regarding **Claim 3**, Yik further teaches a method wherein the primary address table is stored in a memory external to the switch. **(Claim 2 of Yik)**

Regarding **Claim 4**, Yik further teaches a method wherein the step of generating a search index by compressing the computer address further comprises compressing the computer address from a width of 48 bits to a width of less than 48 bits. **(Claim 3 of Yik)**

Regarding **Claim 5**, Yik further teaches a method wherein the step of generating a search index by compressing the computer address further comprises compressing the computer address from a width of 48 bits to a width of 16 bits. **(Claim 4 of Yik)**

Regarding **Claim 6**, Yik further teaches a method further comprising the step of comparing the first value to the computer address in the secondary record. **(Claim 5 of Yik)**

Regarding **Claim 7**, Yik further teaches a method further comprising, if the subsequent secondary record is empty, the step of populating the subsequent secondary record with the computer address and with a port associated with the computer address. **(Claim 6 of Yik)**

Regarding **Claim 8**, Yik further teaches a method further comprising, if the subsequent secondary record is empty, the step of populating the initial secondary address record with the location of the subsequent secondary address record. **(Claim 7 of Yik)**

Regarding **Claim 12**, Yik teaches a storage and search unit for computer addresses each having a fixed bit size n , the unit comprising: **(Claim 8 of Yik Col. 12 Lines 14 to 15)**

a primary address table stored within a first memory of a first bus width, the primary address table configured to store a plurality of primary address records, each primary address record including a respective address entry of a first bit size less than the fixed bit size n , a port number associated with the compressed address entry and a

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first link that links each primary address record to a corresponding chain of secondary address records in a second address table; **(Claim 8 Step a of Yik Col. 12 Lines 16 to 24)**

a secondary address table stored within a second memory separate from the first memory, the second address table configured to store a plurality of secondary address records, each secondary address record including a respective address entry of the first bit size less than the fixed bit size n , a port number associated with the computer address, and a link that links each secondary address record to a corresponding secondary address record in the second address table to thereby form one or more linked chains of secondary address records, wherein each chain of secondary address records contains full address entries of the same hash family; **(Claim 8 Step b of Yik Col. 12 Lines 25 to 36)**

a software search module configured to store and access the primary address records and secondary address records, wherein the software module stores each primary address record in a location defined by the value of the respective compressed address entry. **(Claim 8 Step c of Yik Col. 12 Lines 37 to 41)**

Regarding **Claim 13**, Yik further teaches a storage and search unit wherein the computer addresses comprise MAC addresses. **(Claim 9 of Yik)**

Regarding **Claim 16**, Yik further teaches a storage and search unit wherein the bus width of the first memory is 16 bits. **(Claim 10 of Yik)**

Regarding **Claim 17**, Yik further teaches a storage and search unit wherein the bit size of the compressed address entry is equal to the bus width of the first memory.

(Claim 11 of Yik)

Regarding **Claim 18**, Yik further teaches a storage and search unit wherein the storage and search unit comprises a switch on an Ethernet network. **(Claim 12 of Yik)**

Regarding **Claim 19**, Yik further teaches a storage and search unit wherein the first memory is external to the switch. **(Claim 13 of Yik)**

Regarding **Claim 20**, Yik further teaches a storage and search unit wherein the second memory is internal to the switch. **(Claim 14 of Yik)**

Regarding **Claim 21**, Yik teaches a computer readable software stored within a frame forwarding device of a computer network, the computer readable software code including a set of instructions for causing the device to search for a computer address in an address table, the computer address having a bit size n , the instruction further causing the device to: **(Claim 15 of Yik Col. 12 Lines 55 to 60)**

partition the bit size n computer address into an upper set of $n-m$ bits and a lower set of m bits, wherein m comprises a bit size less than bit size n ;

generate a search index by compressing the upper set of $n-m$ bits to obtain a compressed value of the computer address, wherein the search index comprises a number of bits equal to the number of bits of the lower set of bits; **(Claim 15 step a of Yik Col. 12 Lines 61 to 64)**

access a primary address record corresponding to the computer address in a primary address table, the primary address record being accessed by using the search index to locate the primary address record, wherein the primary address record includes the computer address, a port number associated with the computer address, and a link that specifies the location of an initial secondary address record in a secondary address table; **(Claim 15 Step b of Yik Col. 12 Line 65 to Col. 13 Line 7)**

compare the search index to the primary address record by: **(Claim 15 Step c of Yik Col. 13 Lines 8 to 9)**

selecting the m low order bits of the combination of the search index and the lower set of m bits, wherein a first value is determined,

decompressing the compressed value of the address contained in the primary address record to obtain a second value, and **(Claim 15 of Yik step c, ii Col. 13 Lines 12 to 14)**

comparing the first value to the second value; and **(Claim 15 of Yik step c, iii Col. 13 Line 15)**

if the first value does not equal the second value, then access the initial secondary address record using the link, wherein the initial secondary address record includes a respective address entry of the first bit size less than the fixed bit size n , a

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port number associated with the computer address, and a link to a subsequent secondary address record of the same hash family. **(Claim 15 d of Yik Col. 13 Lines 16 to 22)**

Regarding **Claim 22**, Yik further teaches a computer readable software code wherein the primary address table is stored in a memory external to the switch. **(Claim 16 of Yik)**

Regarding **Claim 24**, Yik further teaches a computer readable software code further including instructions for causing the device to compress the computer address from a width of 48 bits to a width of less than 48 bits. **(Claim 17 of Yik)**

Regarding **Claim 25**, Yik further teaches a computer readable software code further including instructions for causing the device to compress the computer address from a width of 48 bits to a width of 16 bits. **(Claim 18 of Yik)**

Regarding **Claim 26**, Yik further teaches a computer readable software code further including instructions for causing the device to compare the first value to the full computer address in the secondary record. **(Claim 19 of Yik)**

Regarding **Claim 27**, Yik further teaches a computer readable software code further including instructions for causing the device to, if the subsequent secondary

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record is empty, populate the subsequent secondary record with the computer address and with a port associated with the computer address. **(Claim 20 of Yik)**

Regarding **Claim 28**, Yik further teaches a computer readable software code further including instructions for causing the device to, if the subsequent secondary record is empty, populate the initial secondary address record with the location of the subsequent secondary address record. **(Claim 21 of Yik)**

Regarding **Claim 29**, Yik teaches a method of searching for a computer address in an address table, the computer address having a bit size n , the steps comprising:
(Claim 1 of Yik Col. 11 Lines 28 to 30)

partitioning the bit size n computer address into an upper set of $n-m$ bits and a lower set of m bits, wherein m comprises a bit size less than bit size n ;

generating a search index by compressing the upper set of $n-m$ bits to obtain a compressed value of the computer address, wherein the search index comprises a number of bits equal to the number of bits of the lower set of bits; **(Claim 1 Step a of Yik Col. 11 Lines 31 to 34)**

accessing an address record corresponding to the computer address in an address table, the address record being accessed by using the search index to locate the address record, wherein the address record includes the computer address, and a port number associated with the computer address; and **(Claim 1 Step b of Yik Col. 11 Lines 35 to 43)**

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comparing the search index to the address record by: **(Claim 1 Step c of Yik Col. 11 Lines 44 to 45)**

selecting the m low order bits of the combination of the search index and the lower set of m bits, wherein a first value is determined,

decompressing the compressed value of the address contained in the address record to obtain a second value, and **(Claim 1 Step c, ii of Yik Col. 11 Lines 48 to 50)**

comparing the first value to the second value. **(Claim 1 Step c, iii of Yik Col. 11 Line 51)**

Regarding **Claim 30**, Yik further teaches a method wherein the address table is stored in a memory external to the switch. **(Claim 2 of Yik)**

Regarding **Claim 31**, Yik further teaches a method wherein the step of generating a search index by compressing the computer address further comprises compressing the computer address from a width of 48 bits to a width of less than 48 bits. **(Claim 3 of Yik)**

Regarding **Claim 32**, Yik further teaches a method wherein the step of generating a search index by compressing the computer address further comprises compressing the computer address from a width of 48 bits to a width of 16 bits. **(Claim 4 of Yik)**

Regarding **Claim 33**, Yik teaches a method of searching for a computer address in an address table, the computer address having a bit size n , the steps comprising:

generating a search index by compressing the computer address to obtain a compressed value of the address, wherein the search index comprises a first number of bits less than the bit size n ; (**Claim 1 Step a of Yik Col. 11 Lines 31 to 34**)

accessing at least two primary address records corresponding to an equal number of computer addresses stored in a primary address table, the at least two primary address records being accessed by using the search index to locate the primary address records, wherein the primary address records include the computer addresses, a port number associated with each of the computer addresses, and a link that specifies the location of an initial secondary address record in a secondary address table; (**Claim 1 Step b of Yik Col. 11 Lines 35 to 43**)

comparing the search index to the primary address records simultaneously by: (**Claim 1 Step c of Yik Col. 11 Lines 44 to 45**)

decompressing the search index to obtain a first value, (**Claim 1 Step c, i of Yik Col. 11 Lines 46 to 47**)

decompressing the compressed values of the addresses contained in each of the primary address records, and (**Claim 1 Step c, ii of Yik Col. 11 Lines 48 to 50**)

comparing the first value to the values of the addresses of the primary address records; and (**Claim 1 Step c, iii of Yik Col. 11 Line 51**)

if the first value does not equal any of the values of the addresses of the primary address records, then accessing the initial secondary address record using the link,

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wherein the initial secondary address record includes a computer address, a port number associated with the computer address, and a link to a subsequent secondary address record of the same hash family. **(Claim 1 Step d of Yik Col. 11 Lines 52 to 58)**

Regarding **Claim 35**, Yik further teaches a method wherein the primary address table is stored in a memory external to the switch. **(Claim 2 of Yik)**

Regarding **Claim 36**, Yik further teaches a method wherein the step of generating a search index by compressing the computer address further comprises compressing the computer address from a width of 48 bits to a width of less than 48 bits. **(Claim 3 of Yik)**

Regarding **Claim 37**, Yik further teaches a method wherein the step of generating a search index by compressing the computer address further comprises compressing the computer address from a width of 48 bits to a width of 16 bits. **(Claim 4 of Yik)**

Regarding **Claim 38**, Yik further teaches a method further comprising the step of comparing the first value to the computer address in the secondary record. **(Claim 5 of Yik)**

Regarding **Claim 39**, Yik further teaches a method further comprising, if the subsequent secondary record is empty, the step of populating the subsequent secondary record with the computer address and with a port associated with the computer address. **(Claim 6 of Yik)**

Regarding **Claim 40**, Yik further teaches a method further comprising, if the subsequent secondary record is empty, the step of populating the initial secondary address record with the location of the subsequent secondary address record. **(Claim 7 of Yik)**

Regarding **Claim 41**, Yik teaches a method for forwarding a frame to a computer address using classification based upon multiple fields in a header, the header having a first field of bit size $n-m$ and a second field having a bit size m , the steps comprising:

concatenating the first field of bit size $n-m$ and the second field of bit size m into a bit size n , wherein m comprises a bit size less than bit size n ;

generating a search index by compressing the concatenated bit size n to obtain a compressed value of the concatenated fields, wherein the search index comprises a number of bits equal to the number of bits of the second field bit size m ; **(Claim 1 Step a of Yik Col. 11 Lines 31 to 34)**

accessing a primary record corresponding to the computer address in a primary table, the primary record being accessed by using the search index to locate the primary record, wherein the primary record includes the computer address, a port

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number associated with the computer address, and a link that that specifies the location of an initial secondary record in a secondary table; **(Claim 1 Step b of Yik Col. 11**

Lines 35 to 43)

comparing the search index to the primary record by: **(Claim 1 Step c of Yik Col. 11 Lines 44 to 45)**

selecting the concatenated fields of bit size m of the search index and the second field of bit size m , wherein a first value is determined,

decompressing the compressed value of the address contained in the primary record to obtain a second value, and **(Claim 1 Step c, ii of Yik Col. 11 Lines 48 to 50)**

comparing the first value to the second value; and **(Claim 1 Step c, iii of Yik Col. 11 Line 51)**

if the first value does not equal the second value, then accessing the initial secondary record using the link, wherein the initial secondary record includes a respective computer address entry of the bit size $n-m$, a port number associated with the computer address, and a link to a subsequent secondary record of the same hash family. **(Claim 1 Step d of Yik Col. 11 Lines 52 to 58)**

Regarding **Claim 46**, Yik further teaches a method wherein the primary table is stored in a memory external to the switch. **(Claim 2 of Yik)**

Regarding **Claim 49**, Yik teaches a method, further comprising the step of comparing the first field to the computer address in the secondary record. **(Claim 5 of Yik)**

Regarding **Claim 50**, Yik further teaches a method comprising, if the subsequent secondary record is empty, the step of populating the subsequent secondary record with the computer address and with a port associated with the computer address. **(Claim 6 of Yik)**

Regarding **Claim 51**, Yik further teaches a method comprising, if the subsequent secondary record is empty, the step of populating the initial secondary record with the location of the subsequent secondary record. **(Claim 7 of Yik)**

Allowable Subject Matter

4. The following is an examiner's statement of reasons for allowance:

Claims 1-54 are allowed over prior art because the prior art does not teach or suggest a MAC address search engine that uses compressed hash indices for reducing storage space. Furthermore, each index in the primary search table points to a chain of records in a secondary record table contains MAC addresses that belong to the same hash family in combination with all other limitations are directly claimed in all independent claims.

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Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent 5740171 (Mazzola et al.) discusses an address translation mechanism comprised of a number of forwarding tables.

6. Any response to this Office Action should be **faxed** to (571) 272-8300 or **mailed** to:

Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450

Hand-delivered responses should be brought to

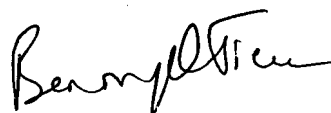
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Randolph Building
401 Dulany Street
Alexandria, Virginia 22314

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ninos Donabed whose telephone number is (571) 270-3526. The examiner can normally be reached on Monday-Thursday, 8:00 AM-5:00 PM EST.

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8. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benny Tieu can be reached on (571) 272-7490. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

9. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.



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